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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.  | CONFIRMATION NO. |
|--|-------------|----------------------|----------------------|------------------|
| 10/690,503   | 10/23/2003  | I-Cherng Chen        | 3313-1048P           | 6047             |
| 2292   | 7590        | 09/09/2005           | EXAMINER             |                  |
| BIRCH STEWART KOLASCH & BIRCH<br>PO BOX 747<br>FALLS CHURCH, VA 22040-0747 |             |                      | LAM, CATHY FONG FONG |                  |
|  |             |                      | ART UNIT             | PAPER NUMBER     |
|  |             |                      | 1775                 |                  |
| DATE MAILED: 09/09/2005  |             |                      |                      |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/690,503

Applicant(s)

CHEN ET AL.

Examiner

Cathy Lam

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1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2005.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 20,21,24-27,30 and 31 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 20,21,24-27,30 and 31 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 20-21, 24-27 and 30-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Wagner et al (Applied Physics Letters).

Wagner discloses a crystalline growth of a metal alloy from vaporization on a silicon substrate. The metal alloy after continuously depositing becomes a silicon whisker.

Silicon and gold impurity formed a liquid alloy that was deposited in a small globule onto a silicon substrate, after continuously depositing the liquid alloy (ie. crystal growth from the vapor or the vapor-liquid-solid mechanism), a nano-whisker is formed. The liquid alloy resembles the surface nanometer functional structure as claimed by applicant.

The examiner takes the position that Wagner's silicon whisker resembles the nanowires that are formed onto a silicon substrate anticipates the present invention. The vaporization depositing steps resemble the surface nanometer functional structure on the substrate.

Since the nanowire is formed by crystal growth from vapor, it is inherent that the nanometer functional structure is a homogeneous layer because in order for one layer

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to grow onto another layer, they need to have at least the same crystalline lattice structure.

Wagner teaches all the same ingredients and the fabrication of the nanostructure, inherently Wagner's nanostructure is the same as the claimed invention.

3. Claims 20-21, 24-27 and 30-31 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kamins et al (US 6248674).

Kamins discloses forming nanowires on a substrate. The nanowires are formed by self-assembly technique (col 1 L 47-48).

A metal-silicon is formed by vapor-liquid-solid over the tip of a wire to grow with length (col 1 L 62-65). The metal-silicon nanowires are grown onto a silicon substrate (col 3 L 23-24). A surface functional structure such as silicon or alkylthiol molecular layer (or organic molecules) are deposited over the surface of the nanowires (col 3 L 2-6).

Since the prior art teaches the nanowires are formed by the self-assembly technique which is claimed by applicant, inherently the surface nanometer functional structure would be a homogeneous functional layer.

### ***Response to Arguments***

4. Applicant's arguments filed on June 14, 2005 have been fully considered but they are not persuasive.

5. Applicant in the remarks raises the issue that Wagner's silicon whisker is a 1000Å whisker rather than a nanostructure.

In respond to the above issue, applicant does not claim any dimensions of the nanowires or nanostructure, thus Wagner continues to meet the claims. Furthermore, Applicant in Embodiment 3 (page 9 line 25) discloses that the nanowires are 70-100 nm, which is equivalent to 700-1000 Å.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Cathy Lam  
Primary Examiner  
Art Unit 1775